



Two Signatures of Implicit Intergroup Attitudes: Developmental Invariance and Early Enculturation

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Two signatures of implicit intergroup attitudes:

Developmental invariance and early enculturation

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Abstract

Long traditions in the social sciences have emphasized the gradual internalization of intergroup attitudes and the putatively more basic tendency to prefer the groups to which one belongs. In four studies ($N = 883$), spanning two cultures and two status groups within one culture, we present new evidence that implicit intergroup attitudes emerge in young children in a form indistinguishable from the adult state. Strikingly, this invariance from childhood to adulthood holds for members of socially dominant majorities, who consistently favor their ingroup, as well as for members of a disadvantaged minority, who, from the early moments of race-based categorization, do not show a preference for their ingroup. Far from requiring a protracted period of internalization, implicit intergroup attitudes are characterized by early enculturation and developmental invariance.

Keywords: intergroup bias, prejudice, cognitive development, social development, cultural differences

One Sentence Summary: Challenging assumptions of gradual enculturation, four experiments demonstrate that a form of implicit intergroup attitude (a) appears early, is (b) invariant across development, and (c) shows early sensitivity to the position of one's group in the sociocultural hierarchy.

Two signatures of implicit intergroup attitudes:

Developmental invariance and early enculturation

Intergroup conflict is a pervasive aspect of modern and pre-modern societies, and understanding its psychological origins is an essential precursor to addressing its often devastating consequences. Across a diversity of fields, scholars have repeatedly suggested two psychological factors as primary constituents of intergroup conflict. First, individuals manifest a putatively basic tendency to prefer and favor the social groups to which they belong, i.e., their *ingroups* (Allport, 1954; Brewer, 1979; Levine & Campbell, 1972; Tooby & Cosmides, 1988). Such preferences are observed in adults and children on multiple measures and for many types of groups, including novel groups created on the spot in the lab (Brewer, 1979; Dunham, Baron, & Carey, 2011), demonstrating that ingroup bias need not depend on a history of prior learning. However, other research has revealed a constraint on this otherwise ubiquitous pattern: Members of socially disadvantaged groups do not consistently demonstrate ingroup preference, especially on measures of implicit social cognition thought to tap lower-level evaluative associations (Bettencourt, Dorr, Charlton, & Hume, 2001; Clark & Clark, 1947; Dunham, Baron, & Banaji, 2007; Jost, Banaji, & Nosek, 2004; Mullen, Brown, & Smith, 2001; Nosek, Banaji, & Greenwald, 2002). Thus, social status appears to counteract what is otherwise a general tendency towards ingroup preference, presumably through a protracted process of social tuning and enculturation to local norms (Bandura, 1977; Davey, 1983; Devine, 1989).

One path to understanding the interplay between ingroup preference and status-based enculturation is to focus on their origins. When does each emerge, and what are their relative contributions across development? The development of intergroup attitudes has been a topic of long-standing interest (see reviews in Aboud, 1988; Bigler & Liben, 2006). A recent large-scale

meta-analysis (Raabe & Beelmann, 2011) reported an initial increase in intergroup bias between ages 4 and 6, followed by its gradual decline through adolescence. Historically, this oft-observed pattern has been interpreted in a neo-Piagetian fashion as the impact of child-specific cognitive limitations (e.g., egocentrism) that are overcome over normative development (Aboud, 1988; Katz, 1983). Unfortunately, this interpretation is difficult to square with the prevalence of subtler forms of implicit or automatic bias in adults (e.g. Nosek et al., 2002), and the few studies that have examined implicit attitudes in children have found that the reduction in self-reported bias is not mirrored for implicit bias. Instead, implicit attitudes appear to be relatively stable between elementary school and adulthood (Baron & Banaji, 2006; Dunham, Baron & Banaji, 2006, 2007; Rutland, Cameron, Milne, & McGeorge, 2006). One interpretation of this pattern is that a combination of self-presentational concerns and the emergence of an explicit egalitarian moral stance drive revisions of explicit attitudes, but leave more basic group-related associations unchanged (Dunham, Baron, & Banaji, 2008).

The current inquiry focuses on the development of implicit race bias, particularly the relative contribution of ingroup preference and status internalization across the lifespan. We focus on race because previous research has shown that preschool-aged children become able to categorize along racial lines, show social preferences with respect to race categories, and begin to express identification with their racial ingroup (see reviews in Aboud, 1988; Cristol & Gimberty, 2008). Thus, race is a relatively early-emerging and salient form of social categorization that eventually comes to feature prominently in myriad forms of social stratification and discrimination. Although the development of race bias has received attention, the majority of prior studies have employed relatively small sample sizes and restricted age ranges (often just two age groups separated by several years), preventing the precise

identification of age trends. Also, there are no studies thus far investigating implicit race bias in children under the age of 6, a critical gap given that race emerges as a socially relevant category at 3 to 4 years of age. Furthermore, studies examining children have generally employed different measures than those examining adults (e.g. simple forced choice preference tasks with children versus sophisticated implicit measures with adults), making direct comparisons across these literatures problematic. Finally, little research compares socially advantaged and disadvantaged populations or different cultures, limiting the ability to pinpoint the role of enculturation and to establish the generality of findings. The present study sought to overcome these limitations through a large-scale inquiry ($N = 883$) spanning four experiments that encompass two participant populations in the U.S., one socially advantaged and one more socially disadvantaged, as well as one participant population in Taiwan.

Specifically, we address the following two questions: When does ingroup preference emerge, relative to the age at which race categories are acquired? Is ingroup preference a more basic response that emerges prior to the internalization of social status, or is the internalization of status equally basic and thus equally early-emerging? By examining groups that vary in status within a single culture as well as groups across distinct cultures, we can produce answers to these questions that are likely to be generalizable. To circumvent confounds with developments in social awareness and self-presentational concern, we employed an indirect measure of attitude that does not rely on self-report. In prior research (Hugenberg & Bodenhausen, 2004), White American adults were shown a series of computer-generated, racially ambiguous faces designed to be intermediate between prototypical White and Black facial morphology. The facial expression was varied such that each face appeared in happy and angry expressions (Figure 1); participants categorized the faces as White or Black in a forced-choice manner. Results

demonstrated that angry faces were more likely to be categorized as Black, while happy faces were more likely to be categorized as White. Crucially, this tendency could be predicted from implicit anti-Black attitude, as measured by the Implicit Association Test (IAT; Greenwald, McGhee, & Shwartz, 1988), a relationship that has been replicated several times (Dunham, 2011; Hutchings & Haddock, 2008). No such relationship appeared with respect to self-reported bias, suggesting that the effect is rooted in an automatic association between anger and social categories.

An advantage of this task was its suitability for young children, for whom lengthy reaction time measures may not be appropriate (Ratcliff, Love, Thompson, & Opfer, 2012), especially measures like the IAT which centrally implicate executive function capacities (such as task switching; Klauer, Schmitz, Teige-Mocigemba, & Voss, 2010) that are notoriously unstable developmentally (e.g. Davidson, Amso, Anderson, & Diamond, 2006). Thus, in addition to the theoretical goals highlighted above, we also hoped to contribute a new implicit measure to the developmental intergroup literature by demonstrating a straightforward form of intergroup bias, namely a link between perception of facial affect and race-based categorization.

Experiment 1

Method

Participants

We tested 263 White American children aged 3 to 14 ($M = 7.3$ years, $sd = 2.7$) and 79 adults recruited from a local museum in the greater Boston area and from lab-related research subject pools. A single experimenter tested participants alone in a quiet room.

Materials

Materials were computer-generated male faces designed and pretested in prior research (Hugenberg & Bodenhausen, 2004; for the use of similar stimuli, see Hutchings & Haddock, 2008; Stepanova & Strube, 2012; Todorov Said, Engell, & Oosterhof, 2008) to be intermediate between prototypical White and Black faces and to display unambiguous positive or negative affect (see Figure 1). There were 15 unique faces and two versions of each face, one with positive (happy) and one with negative (angry) affect, for a total of 30 target stimuli.

Procedure

Participants were told that they would view faces on the computer screen and categorize them as Black or White by pressing one of two labeled response keys. The procedure began with a *pretest training phase*, in which participants categorized 4 clear exemplars of Black and White faces. This was followed by the *test phase*, which consisted of 30 trials, each trial displaying one of the 30 target stimuli (15 happy, 15 angry) in random order, which participants categorized as Black or White. The procedure took approximately 5 minutes.

Analysis

To respect the nested nature of the data (trials nested within participants) and the dichotomous outcome (categorization as Black or White), data were analyzed via multi-level logistic regression (Guo & Zhao, 2000), modeling the probability of categorizing a face as Black, with effect sizes expressed as odds ratios indicating the increased probability of categorizing an angry face as Black as opposed to White. In addition to our primary question variables of facial expression (angry or happy) and participant age, we controlled for mean image luminosity, which varied somewhat across faces.

Results

As a whole, angry faces were 1.32 times as likely to be categorized as Black than were happy faces (95% CIs [1.20, 1.45], $\beta = .28$, $se = .048$, $p < .001$). Crucially, no interaction between age and facial expression was present ($\beta = .004$, $se = .009$, $p = .70$), indicating that the strength of this effect was consistent across the age ranges examined (Figure 2a). Indeed, the effect of facial expression was significant in just the 3- and 4-year-old participants ($n = 64$, Odds ratio = 1.22, CIs [1.01, 1.50], $\beta = .21$, $se = .10$, $p = .04$).

The invariance of intergroup bias is particularly interesting in light of other expected age-related changes in face processing (Taylor, Babby, & Ittier, 2004), most notably the tendency for older participants to categorize more faces overall as Black: for each additional age-year, participants were 1.15 times more likely to categorize a face as Black as opposed to White (CIs [1.12, 1.18], $\beta = 1.33$, $se = .17$, $p < .001$). The effect can be conceptualized in terms of an increasing tendency to exclude ambiguous faces from the ingroup (the ‘ingroup over-exclusion effect’; Levens & Yzerbyt, 1992). However, this tendency was unrelated to the magnitude of bias in our data.

As noted above, children generally acquire racial categories around ages 3 and 4 (Aboud, 1988), and indeed our sample included a number of children who were unable to correctly classify unambiguous faces in the training phase. To more closely link category acquisition to intergroup bias, in a supplementary analysis, we entered the number of successful categorizations at pretest (a proxy for category possession) as an additional predictor in our model and examined the interaction between categorization ability and facial expression. This interaction was significant ($\beta = .96$, $se = .38$, $p = .012$), indicating that the effect of facial expression was greater in children who could successfully categorize by race. Indeed, the 44 children who were unable to categorize by race at pretest were the only identifiable group in which the “angry = Black”

effect was not significant ($\beta = .03$, $se = .13$, $p = .79$). In one sense, this result is obvious: Children incapable of categorizing by race are unlikely to systematically discriminate on the basis of race. However, this finding suggests tight temporal synchrony between emergence of the ability to categorize by race and emergence of intergroup bias with respect to race: Categorization ability is predictive, but age is not.

Discussion

In the particular form examined here, preference for a racial ingroup in majority children appears as soon as intergroup categories are acquired, and is not modified by subsequent social experience. Children and adults have markedly different degrees of intergroup experience and abstract knowledge about social groups, including what constitutes “us and them”; as such, the invariance observed here is striking. It is also incompatible with accounts of intergroup bias that depend on pure-hearted children gradually internalizing society’s ills (e.g. Davey, 1983; Devine, 1989).

But is this result limited to the White-Black racial contrast, rooted as it is in the particular history of those groups in the United States? To investigate this question, we replicated the experiment using a White-Asian face contrast. In the U.S., Asian Americans sit higher on the social hierarchy than Black Americans, and are not stereotypically associated with anger or hostility (Chang & Demyan, 2007). If the previous result is limited to the White-Black intergroup relationship, or is dependent on a learned association between a specific group (Black) and a specific trait (anger), the link between anger and outgroup should be weakened or eliminated in the White-Asian comparison.

Experiment 2

Method

Participants

We tested 80 White American children between the ages 5 and 12 ($M = 9.5$ years, $sd = 1.6$) and 83 adults, recruited in the same manner as described in Experiment 1.

Materials

We created a new set of stimuli designed to be ambiguous between prototypical White and Asian male faces (see Figure 1, right panel). Faces were rated in neutral facial expression by an independent group of 16 adult raters on a 7-point scale ranging from “Obviously Asian” to “Obviously White” and we selected 15 faces rated near the midpoint of the scale (statistically distinct from racially unambiguous White and Asian faces). Angry and happy faces were then constructed from these neutral faces to produce our final set of 30 images.

Procedure and Analysis

Procedure and analysis were the same as in Experiment 1, except that we included 8 trials with unambiguous faces in the initial training phase. Because our facial images did not differ in mean image luminosity, controlling for that factor was not necessary.

Results and Discussion

Closely replicating the results of Experiment 1, angry faces were 1.38 times as likely to be categorized as belonging to the Asian outgroup than were happy faces (CIs [1.23, 1.55], $\beta = .32$, $se = .06$, $p < .001$), an effect that did not differ in magnitude from the effect of facial expression observed in Experiment 1 ($\beta = .11$, $se = .074$, $p = .14$). This effect was again constant across the ages tested, as evidenced by a non-significant interaction between age and facial expression ($\beta = .0016$, $se = .014$, $p = .91$), depicted in Figure 2b. Thus, implicit ingroup preference in White American children emerges early, is surprisingly invariant across age, and represents a general intergroup effect not constrained to a single social contrast.

Still, the U.S. has a particular racial history in which all non-White groups are at least relatively disadvantaged. Therefore, we sought to explore the cross-cultural generality of developmental invariance by conducting a third experiment in a society that is far more racially homogeneous than the U.S., and in which our target outgroup is not socially disadvantaged. To do so, we turned to Taiwan (Brown, 1996), a racially homogenous culture (Taiwan Government Information Office, 2011) in which children's exposure to racially White individuals occurs largely through portrayals of Whites in toys and Western media (Chang & Reifel, 2003); indeed, Taiwanese children appear to be positively predisposed towards Whites in general (Kowalski & Lo, 2001). The same effect of age-invariance, if obtained, would suggest that it generalizes across a wide range of social and cultural variation.

Experiment 3

Method

Participants

We tested 201 Taiwanese children between 4 and 12 years ($M = 9.8$ years, $sd = 2.5$) and 80 Taiwanese adults in the same general manner as described above. Participants were recruited from a local university in Taipei, Taiwan, as well as from the university's affiliated preschool and elementary schools.

Materials, Procedure, and Analysis

Materials, procedure, and analysis were all identical to Experiment 2, above, and translated into Mandarin. A Taiwanese experimenter conducted the study for all participants.

Results and Discussion

At first glance, Experiment 3 appeared to reveal a somewhat different pattern of results. Although the effect of facial expression was significant ($\beta = .21$, $se = .098$, $p = .032$), this effect

was qualified by an interaction with age, suggesting an increase in the strength of bias as a function of age, ($\beta = .02$, $se = .006$, $p = .002$). However, closer inspection of the data revealed that many younger children were unable to categorize unambiguous faces by race in our pretest trials; indeed, categorization ability and age were highly correlated, $r(280) = .51$, $p < .001$. Given that children who have not yet acquired racial categories should not be expected to show the angry = outgroup effect, we conducted a follow-up analysis to see whether age continued to predict the strength of bias once pretest categorization ability was entered into the model. It did not; when the number of successful categorizations at pretest was included, the interaction between age and facial expression dropped from significance, ($\beta = .012$, $se = .007$, $p = .11$), while the interaction between categorization ability and facial expression was significant ($\beta = .52$, $se = .23$, $p = .026$). Thus, the emergence of bias was related to the ability to categorize by race. Considering those participants who were successful on all categorization trials, angry faces were 1.24 times as likely to be categorized as White than Asian (CIs [1.10, 1.41], $\beta = .49$, $se = .16$, $p = .003$), an effect similar in magnitude to what we observed in the first two experiments (Figure 2c). Importantly, by showing that the very same stimuli categorized as Asian by White participants were categorized as White by Taiwanese participants, we also rule out the possibility that other stimulus features (e.g. if angry faces incidentally resembled Asian faces more than White faces) drove our effects. In sum, although the acquisition of the White-Asian racial distinction is delayed in a homogenous Taiwanese population, we again observed an age-invariant tendency to associate anger with racial outgroups once this delay is accounted for.

Across three experiments spanning two cultures, we observed ingroup preference as well as age-invariance in the strength of that preference. That is, the attitudes of the youngest members of a social group are indistinguishable from those of their adult counterparts, at least

amongst children who have acquired the ability to categorize by race. This pattern is compatible with the idea that such preferences are automatic in nature, but a final critical question remains. Our White American and Taiwanese participants are both majority and high-status in their respective cultures, meaning that ingroup favoritism and status internalization are directionally consistent and therefore difficult to disentangle. For members of stigmatized cultural minorities, like Black and Latino Americans, this ingroup favoring pattern is not consistently shown, especially on automatic or implicit measures (Dunham et al., 2007; Newheiser & Olson, in press; Nosek et al., 2002). Will members of a disadvantaged group initially show a preference for their own group, which is then drummed out through subsequent learning? Or are intergroup preferences so closely tuned to prevailing social hierarchies that, even early in development, children from a socially disadvantaged group show the pattern of attitudinal ambivalence characterizing adults in their group? To investigate, we examined the developmental timing of ingroup preference and status internalization in Black Americans.

Experiment 4

Method

Participants

We tested 56 Black American children between ages 4 and 10 ($M = 7.6$ years, $sd = 1.3$) and 41 Black adults. Children were recruited from two predominately Black elementary schools in the greater Boston area; adults were university undergraduates.

Materials, Procedure, and Analysis

Materials, procedure, and analysis were identical to that described in Experiment 1.

Results and Discussion

In contrast to the data from the previous three experiments, Black American participants showed no overall effect of facial expression on categorization (Odds ratio = 1.00, CIs [.84, 1.19], $\beta = .001$, $se = .087$, $p = .99$), indicating no evidence of an ingroup-favoring bias. For Black Americans, angry faces were not viewed as more or less likely to belong to the racial outgroup; nor was there an interaction between facial expression and age ($\beta = .007$, $se = .017$, $p = .69$), indicating that this same general pattern characterized children and adults across the full age range (Figure 2d). Furthermore, while we again included children still acquiring race categories (as revealed by the correlation between age and pretest categorization ability, $r(96) = .44$, $p < .001$), categorization ability was unrelated to race bias ($\beta = .33$, $se = .27$, $p = .23$).

Thus, from the earliest moments of race consciousness, Black Americans do not show the pattern of ingroup preference observed in majority populations. Indeed, directly comparing the results of Experiments 1 and 4, the tendency to associate angry faces with the outgroup was present in White but not Black participants, (Odds ratio = 1.17, CIs [1.00, 1.37], $\beta = .27$, $se = .10$, $p = .007$). The pattern across these two studies also again demonstrates that results are not due to lower level stimulus features such as an angry faces incidentally resembling Black; if that were the case, both White and Black participants should have been sensitive to those factors and categorized more angry faces as Black. At a more general level, we again observed developmental invariance: Across several groups varying in culture and status, children's intergroup attitudes do not require a protracted period of environmental tuning, but rather are rapidly fixed at levels commensurate with their adult counterparts.

Could these results instead stem from Black participants' greater familiarity with the White majority? Although familiarity can affect preferences (e.g. Zajonc, 2001), we do not believe it is sufficient here, for two reasons. First, our participants come from majority Black

schools and neighborhoods, complicating any simple argument from familiarity. Second, recent evidence suggests that when familiarity and status are in opposition, status clearly wins: Black South African children, including those from with little or no contact with Whites, do not show preference for their racial ingroup at either the explicit or implicit level (Shutts, Kinzler, Katz, Tredoux, & Spelke, 2011; Newheiser, Dunham, Merrill, Hoosain, & Olson, under review). Thus, we interpret our results as suggesting that the internalization of the prevailing status hierarchy is a rapidly emerging psychological imperative no less “basic” than a tendency towards ingroup preference.

General Discussion

These data diverge markedly from prior developmental work, in which children’s self-reported intergroup bias declines with age (Aboud, 1988; Raabe & Beelmann, 2011). We argue that previous research charts the development towards an explicit, culturally-sanctioned egalitarianism that is distinct from the underlying patterns of implicit evaluation observed here (Dunham et al., 2008). More broadly, we offer several conclusions. First, ingroup preference and status internalization are automatic, early-emerging mechanisms of preference formation, appearing concurrently with the child’s explicit ability to categorize by race. Second, the fact that these mechanisms do not show appreciable age-related change strongly suggests that, rather than depending on gradual enculturation or social tuning, they represent a form of rapid social orienting, in which children map membership and status onto existing social groups while simultaneously acquiring representations of those groups. Lastly, although ingroup preference may be a general phenomenon, it is not inevitable; an important boundary condition is revealed when we shift to focus on the socially disadvantaged, for whom cues to group-based social status are influential from the earliest moments of social categorization. While other research has also

reported a lack of implicit ingroup preference in non-White children (Dunham et al., 2007; Newheiser & Olson, 2012), our inclusion of younger children and our direct comparison between majority and minority populations provides a stricter test of both age invariance and status internalization.

As in other investigations of implicit attitudes, we observed widespread variability in the strength of implicit bias at the participant level (as is visible across all four panels of Figure 2). One source of variability is the general noise inherent in developmental data and implicit measurement. But future work should search for other, as yet unobserved moderators of bias. Plausible candidates include the presence of positive forms of intergroup interaction and diversity (e.g. McGlothlin & Killen, 2010), as well as individual differences in tendencies towards the essentializing of group boundaries (Rhodes, Leslie, & Tworek, in press).

Views of intergroup attitudes often contrast an automatic tendency toward ingroup preference with the gradual internalization of cultural value. The four studies reported here suggest that the temporal assumption embedded in that dichotomy is misguided; ingroup preference and status sensitivity both emerge with equal rapidity early in life, and both are equally impervious to subsequent social input. Thus, rapid enculturation and developmental invariance emerge as two constitutive components driving implicit intergroup bias.

We have focused on a simple form of implicit intergroup bias driven by a connection between facial expression and racial categorization. When we turn to richer forms of social knowledge, adults and children clearly differ, and we make no claims about the developmental timing of such knowledge (e.g. culturally consensual stereotypes, which must be socially learned in a different fashion). Nonetheless, a basic system of social evaluation emerges in early childhood and persists unchanging into adulthood.

References

- Aboud, F. A. (1988). *Children and prejudice*. New York, NY: Basil Blackwell.
- Allport, G. W. (1954). *The nature of prejudice*. Reading, MA: Addison-Wesley.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.
- Baron, A. S., & Banaji, M. R. (2006). The development of implicit attitudes. *Psychological Science*, 17, 53-58. doi: 10.1111/j.1467-9280.2005.01664.
- Bettencourt, B.A., Dorr, N., Charlton, K., & Hume, D.L. (2001). Status differences and in-group bias: A meta-analytic examination of the effects of status stability, status legitimacy, and group permeability. *Psychological Bulletin*, 127, 520-542. doi: 10.1037/0033-2909.127.4.520
- Bigler, R. S., & Liben, L. S. (2006). A developmental intergroup theory of social stereotypes and prejudice. In R. V. Kail (Ed.), *Advances in child development and behavior*, 34 (pp. 39-89). San Diego, CA: Elsevier.
- Brand, E., Ruiz, R., & Padilla, A. (1974). Ethnic identification and preference: a review. *Psychological Bulletin* 81, 860-890. doi: 10.1037/h0037266
- Brewer, M. (1979). In-group bias in the minimal intergroup situation, *Psychological Bulletin*, 86, 307-324. doi: 10.1037/0033-2909.86.2.307
- Brown, M. J. (Ed.). (1996). *Negotiating ethnicities in China and Taiwan*. Seattle, WA: University of Washington Press.
- Chang, D. F., & Demyan, A. L. (2007). Teachers' stereotypes of Asian, Black, and White students. *School Psychology Quarterly*, 22, 91-114. doi: 10.1037/1045-3830.22.2.91
- Chang, L.-C., & Reifel, S. (2003) Play, racial attitudes, and self-concept in Taiwan. In D. E. Lytle (Eds.), *Play and educational theory and practice* (pp. 257-276). Westport, CT: Greenwood Publishing Group.

- Clark, K. B., & Clark, M. K. (1947). Racial identification and preference in Negro children. In T. Newcombe & E. Hartley (Eds.), *Readings in social psychology* (pp. 169–178). New York, NY: Holt.
- Cristol, D., & Gimbert, B. (2008). Racial perceptions of young children: A review of literature post-1999. *Early Childhood Educational Journal*, 36, 201-207. doi: 10.1007/s10643-008-0251-6
- Davey, A. (1983). *Learning to be prejudiced*. London: Edward Arnold.
- Davidson, M. C., Amso, D., Anderson, L. C., & Diamond, A. (2006). Development of cognitive control and executive functions from 4 to 13 years: Evidence from manipulations of memory, inhibition, and task switching. *Neuropsychologia*, 44(11), 2037-2078. doi: 10.1016/j.neuropsychologia.2006.02.006
- Devine, P. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology*, 56, 5-18. doi: 10.1037/0022-3514.56.1.5
- Dunham, Y. (2011). An angry = outgroup effect. *Journal of Experimental Social Psychology*, 47, 668-671.
- Dunham, Y., Baron, A. S., & Banaji, M. R. (2006). From American city to Japanese village: A cross-cultural investigation of implicit race attitudes. *Child Development*, 77(5), 1268-1281.
- Dunham, Y., Baron, A. S., & Banaji, M. R. (2007). Children and social groups: A developmental analysis of implicit consistency in Hispanic Americans. *Self and Identity*, 6(2-3), 238-255. doi: Doi 10.1080/15298860601115344
- Dunham, Y., Baron, A.S., & Banaji, M.R. (2008). The development of implicit intergroup cognition. *Trends in Cognitive Science*, 12, 248-253. doi: 10.1016/j.tics.2008.04.006

- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology*, 76, 1464-1480. doi: 10.1037/0022-3514.74.6.1464
- Guo, G., & Zhao, H. (2000). Multilevel modeling for binary data. *Annual Review of Sociology*, 26, 441-462.
- Hugenberg, K., & Bodenhausen, G. V. (2004). Ambiguity in social categorization: The role of prejudice and facial affect in race categorization. *Psychological Science*, 15, 342-345. doi: 10.1111/j.0956-7976.2004.00680.x
- Hutchings, P.B. & Haddock, G. (2008). Look Black in anger: The role of implicit prejudice in the categorization and perceived emotional intensity of racially ambiguous faces. *Journal of Experimental Social Psychology*, 44, 1418-1420.
- Jost, J. T., Banaji, M. R., & Nosek, B. A. (2004). A decade of system justification theory. *Political Psychology*, 25, 881-919.
- Katz, P. A. (1983). Developmental foundation of gender and racial attitudes. In R. Leahy (Ed.), *The child's construction of social inequality* (pp. 41-78). New York, NY: Academic Press.
- Klauer, K.C., Schmitz, F., Teige-Mocigemba, S., & Voss, A. (2010). Understanding the role of executive control in the Implicit Association Test: Why flexible people have small IAT effects. *The Quarterly Journal of Experimental Psychology*, 63, 595-619. doi: 10.1080/17470210903076826
- Kowalski, K., & Lo, Y.-F. (2001). The influence of perceptual features, ethnic labels, and sociocultural information on the development of ethnic/racial bias in young children. *Journal of Cross-Cultural Psychology*, 32, 444-455. doi: 10.1177/0022022101032004005
- Levine, R. A., & Campbell, D. T. (1972). *Ethnocentrism*. New York, NY: Wiley.

- Leyens, J., & Yzerbyt, V. Y. (1992). The ingroup overexclusion effect: Impact of valence and confirmation on stereotypical information search. *European Journal of Social Psychology*, 22, 549-569. doi: 10.1002/ejsp.2420220604
- McGlothlin, H. & Killen, M. (2010). How social experience is related to children's intergroup attitudes. *European Journal of Social Psychology*, 40, 625-634.
- Mullen, B., Brown, R., & Smith, C. (1992). Ingroup bias as a function of salience, relevance and status. *European Journal of Social Psychology*, 22, 103-122. doi: 10.1002/ejsp.2420220202
- Newhiesier, A., Dunham, Y., Merrill, A., Hoosain, L., & Olson, K.R. (under review). Preference for high status predicts implicit outgroup bias among children from low-status groups.
- Newheiser, A., & Olson, K. R. (in press). Attitudes toward social status predict White and Black children's implicit intergroup bias. *Journal of Experimental Social Psychology*.
- Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). Harvesting implicit attitudes and beliefs from a demonstration website. *Group Dynamics: Theory, Research, and Practice*, 6, 101-115. doi: 10.1037/1089-2699.6.1.101
- Raabe, T., & Beelmann, A. (2011). Development of ethnic, racial, and national prejudice in childhood and adolescence: A multinational meta-analysis of age differences. *Child Development*, 82, 1715-1737. doi: 10.1111/j.1467-8624.2011.01668.x
- Ratcliff, R., Love, J., Thompson, C.A., & Opfer, J.E. (2012). Children are not like older adults: A diffusion model analysis of developmental changes in speeded responses. *Child Development*, 83, 367-381. doi: 10.1111/j.1467-8624.2011.01683.x
- Rhodes, M., Leslie, S.J., & Tworek, C. (in press). The cultural transmission of social essentialism. *Proceedings of the National Academy of Sciences*.

- Rutland, A., Cameron, L., Milne, A., & McGeorge, P. (2005). Social norms and self-presentation: Children's implicit and explicit intergroup attitudes. *Child Development, 76*, 451-466. doi: 10.1111/j.1467-8624.2005.00856.x
- Shutts, K., Kinzler, K. D., Katz, R. C., Tredoux, C., & Spelke, E. S. (2011). Race preferences in children: Insights from South Africa. *Developmental Science, 14*, 1283-1291.
- Stepanova, E. V., & Strube, M.J. (2012). The role of skin color and facial physiognomy in racial categorization: Moderation by implicit racial attitudes. *Journal of Experimental Social Psychology*. Forthcoming.
- Taiwan Government Information Office. (2011). Chapter 2: People and language. *The Republic of China Yearbook 2011*. Retrieved from <http://www.gio.gov.tw/taiwan-website/5-gp/yearbook/docs/ch02.pdf>
- Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33-47). Monterey, CA: Brooks/Cole.
- Taylor, M. J., Batty, M., & Ittner, R. J. (2004). The faces of development: A review of early face processing over childhood. *Journal of Cognitive Neuroscience, 16*, 1426-1442. doi: 10.1162/0898929042304732
- Todorov, A., Said, C.P., Engell, A.D., & Oostehof, N.N. (2008). Understanding evaluation of faces on social dimensions. *Trends in Cognitive Sciences, 12*(12), 455-460. doi: 10.1016/j.tics.2008.10.001
- Tooby, J., & Cosmides, L. (1988). *The evolution of war and its cognitive foundations* (Institute for Evolutionary Studies Technical Report 88-1). Ann Arbor, MI.

Zajonc, R. B. (2001). Mere exposure: A gateway to the subliminal. *Current Directions in Psychological Science*, 10(6), 224-228.

Figure Captions

Figure 1. Sample ambiguous race stimuli from complete set of 15 faces per racial contrast.

White-Black set (Studies 1 and 4) used with permission from (20); White-Asian set (Studies 2 and 3) produced by the first author. All stimuli were independently rated as racially ambiguous when presented with neutral facial expressions intermixed with unambiguous stimuli.

Figure 2: Odds ratios estimating the increased likelihood of categorizing an angry face into the outgroup, with 95% confidence intervals for Experiments 1—4 (plotted against right axis) and raw participant data, displayed as the difference between the percentage of angry faces categorized as Black and the percentage of angry faces categorized as White (plotted against left axis). For ease of presentation, odds ratios are presented for discrete age bins, but all analyses employed age as a continuous variable, and the effect of age was non-significant in all four experiments.

Figure 2a: Increased likelihood of White Participants categorizing an angry face as Black as opposed to White (odds ratios) for 3-year age bands in **Experiment 1**. Raw data for each participant (plotted as percentage shift of angry faces towards Black) in light grey; dashed line is OLS regression of age on odds ratio (non-significant).

Figure 2b: Increased likelihood of White Participants categorizing an angry face as Asian as opposed to White (odds ratios) for 3-year age bands in **Experiment 2**. Raw data for each participant (plotted as percentage shift of angry faces towards Asian) in light grey; dashed line is OLS regression of age on odds ratio (non-significant).

Figure 2c: Increased likelihood of Taiwanese Participants categorizing an angry face as White as opposed to Asian (odds ratios) for 3-year age bands in **Experiment 3**, estimated for

participants successful at pretest categorization measure. Raw data for each participant (plotted as percentage shift of angry faces towards White) in light grey; dashed line is OLS regression of age on odds ratio (non-significant).

Figure 2d: Increased likelihood of Black Participants categorizing an angry face as White as opposed to Black(odds ratios) for 2.5-year age bands in **Experiment 4**. Raw data for each participant (plotted as percentage shift of angry faces towards White) in light grey, with OLS regression of age on percentage shift in dashed red; dashed line is OLS regression of age on odds ratio (non-significant).

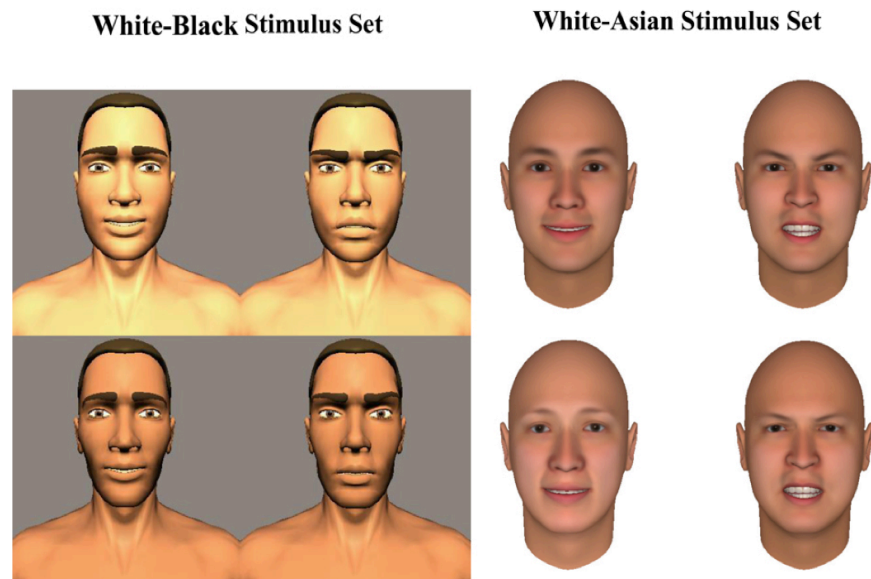
Figure 1

Figure 2a

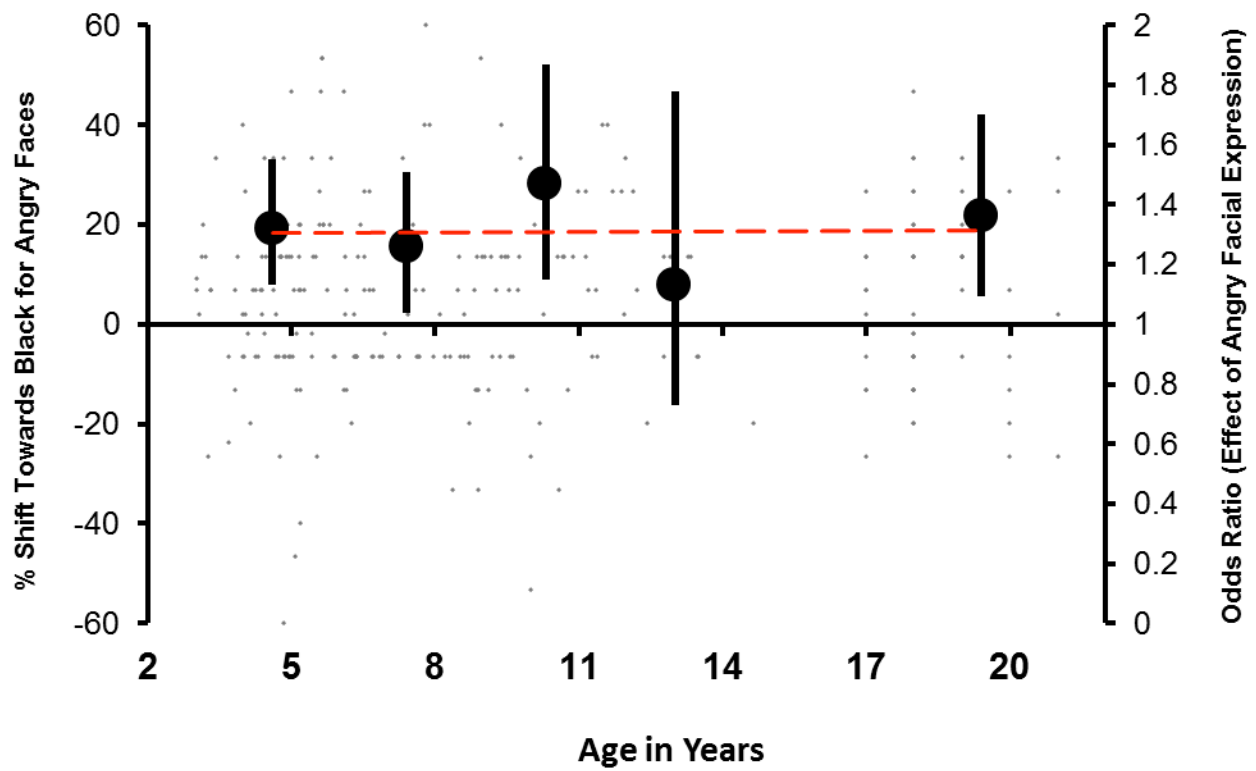


Figure 2b

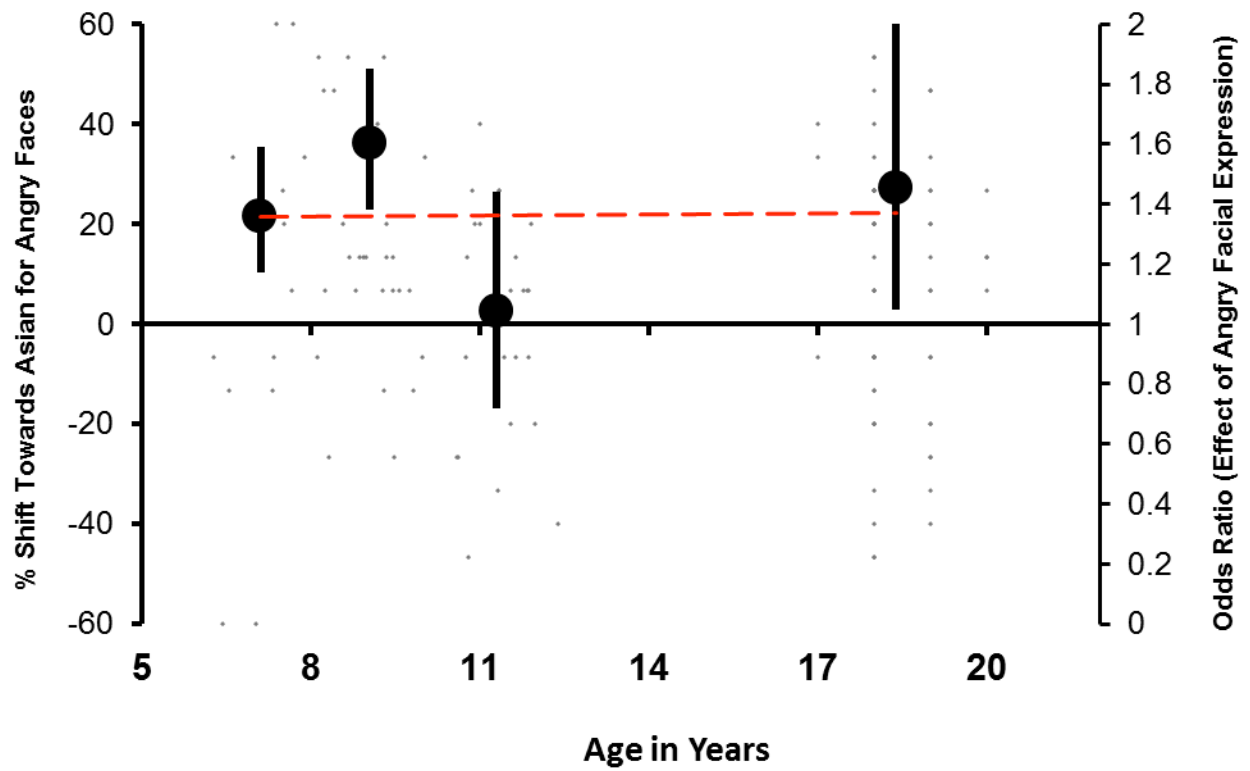


Figure 2c

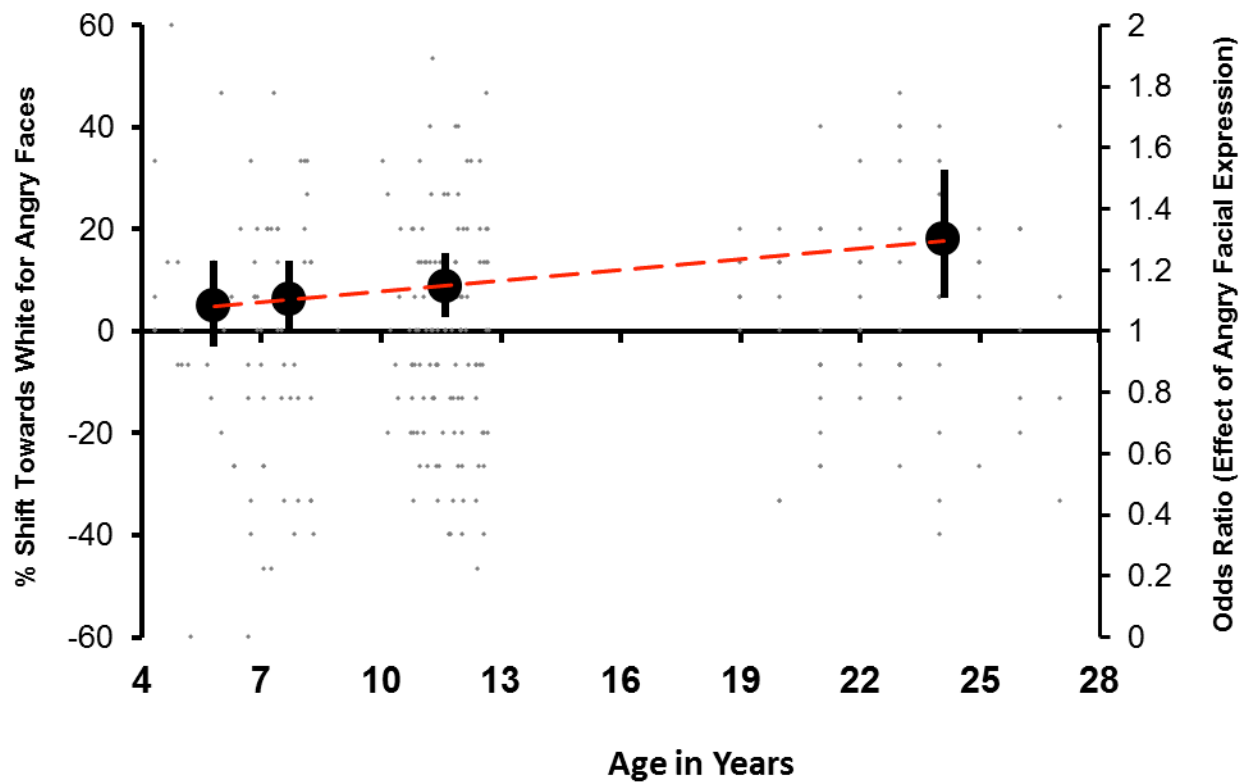


Figure 2d

